



U.S. Department
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**Federal Highway
Administration**



ITS/CVO Funding Strategies for States

prepared for

Federal Highway Administration

prepared by

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1.0 Introduction

This paper is designed to provide funding guidance for state officials who intend to develop, operate, and maintain Intelligent Transportation Systems/Commercial Vehicle Operations (ITS/CVO) projects and programs.

■ Background

CVO comprise approximately three dozen areas of interaction involving public agencies and motor carriers. Examples of these areas are vehicle registration; fuel tax collection; carrier, driver, and vehicle safety regulation and inspection; and hazardous materials routing. ITS/CVO refers to the application of advanced and emerging communications, information, and sensor technologies to increase the safety of commercial vehicles, streamline the administration of motor carrier regulations, and reduce congestion costs for motor carriers.

In 1991, the Intermodal Surface Transportation Efficiency Act (ISTEA) established a national ITS program and authorized funding for research, development, and testing of new technologies. The ISTEA succeeded in establishing a national ITS/CVO program, which is developing capabilities in four broad areas, as follows:

- **Safety Assurance** – Projects and services designed to improve the safety regulation of motor carriers and their drivers, vehicles, and cargo. These include automated roadside safety inspection and carrier review systems, safety information systems, and on-board safety monitoring.
- **Credentials Administration** – Projects and services designed to improve deskside procedures and systems for administering motor carrier taxes and permits. These include the electronic application, purchasing, and issuance of credentials, as well as electronic tax reporting and filing.
- **Electronic Screening** – Projects and services designed to facilitate the verification of truck size, weight, and cargo. These include automated roadside vehicle screening and clearance systems at weigh stations and international border crossings.
- **Carrier Operations** – Projects and services designed to reduce congestion and manage the flow of commercial vehicle traffic. The public sector role in this area focuses on hazardous materials incident response services and travel advisory services. The private sector is taking leadership in the deployment of fleet and vehicle management technologies and systems that improve motor carrier productivity.

Underpinning these activities are two FHWA-funded initiatives:

- **CVISN (Commercial Vehicle Information Systems and Networks) Program** – Technical research and model deployment projects to develop and demonstrate a national information system architecture for ITS/CVO applications; and
- **Mainstreaming Program** – Planning, policy development, and program management activities supporting the development of state, regional, and national ITS/CVO programs.

The national ITS/CVO program's accomplishments as of early 1998 include the following:

- **CVISN Model Deployment** – Two prototype states and eight pilot states are participating in the model deployment of the technologies developed in the CVISN initiative, which include safety information systems, electronic screening programs, and electronic credentialing programs. The U.S. Department of Transportation (DOT) has set an ambitious goal of deploying the basic CVISN capabilities in all 50 states by 2005, with an estimated total cost of \$6 to \$8 million per state. Costs will be shared equally between the Federal government and participating states.
- **International Border Clearance** – In a cooperative effort with the customs and immigration agencies, the U.S. DOT is testing international border clearance systems at eight major crossings on the northern and southern borders. These systems are expected to be extended to other border crossings over the next several years.
- **State ITS/CVO Business Plans** – The FHWA has brought together 37 states to date in its ITS/CVO Mainstreaming initiative, which includes the development of State ITS/CVO Business Plans that define broad goals and objectives and lay out specific projects, schedules, and responsibilities. The first round of Business Plans was completed in early 1998. Regional Coordination Plans are now being developed in four “truckshed” regions.

■ Funding Environment

Traditionally, the grant-based pay-as-you-go Federal highway program and individual state highway programs have been adequate to support the development and operation of CVO facilities and systems. As the states prepare for widespread deployment of ITS/CVO technologies, new challenges are emerging:

- National ITS/CVO priorities and Federal funding emphases are moving from research, planning, and operational testing to *deployment*, a trend marked by the upcoming reauthorization of the ITS program in the successor legislation to the ISTEA. The ITS program reauthorization is expected to include a deployment incentive funding initiative, but this program is likely to provide funding for only four to seven states each year.
- Generally, current Federal transportation funding mechanisms are geared toward projects with high capital costs and low operating and maintenance costs. In contrast,

operations and maintenance costs account for a substantially larger share of the total stream of costs for many ITS/CVO projects.

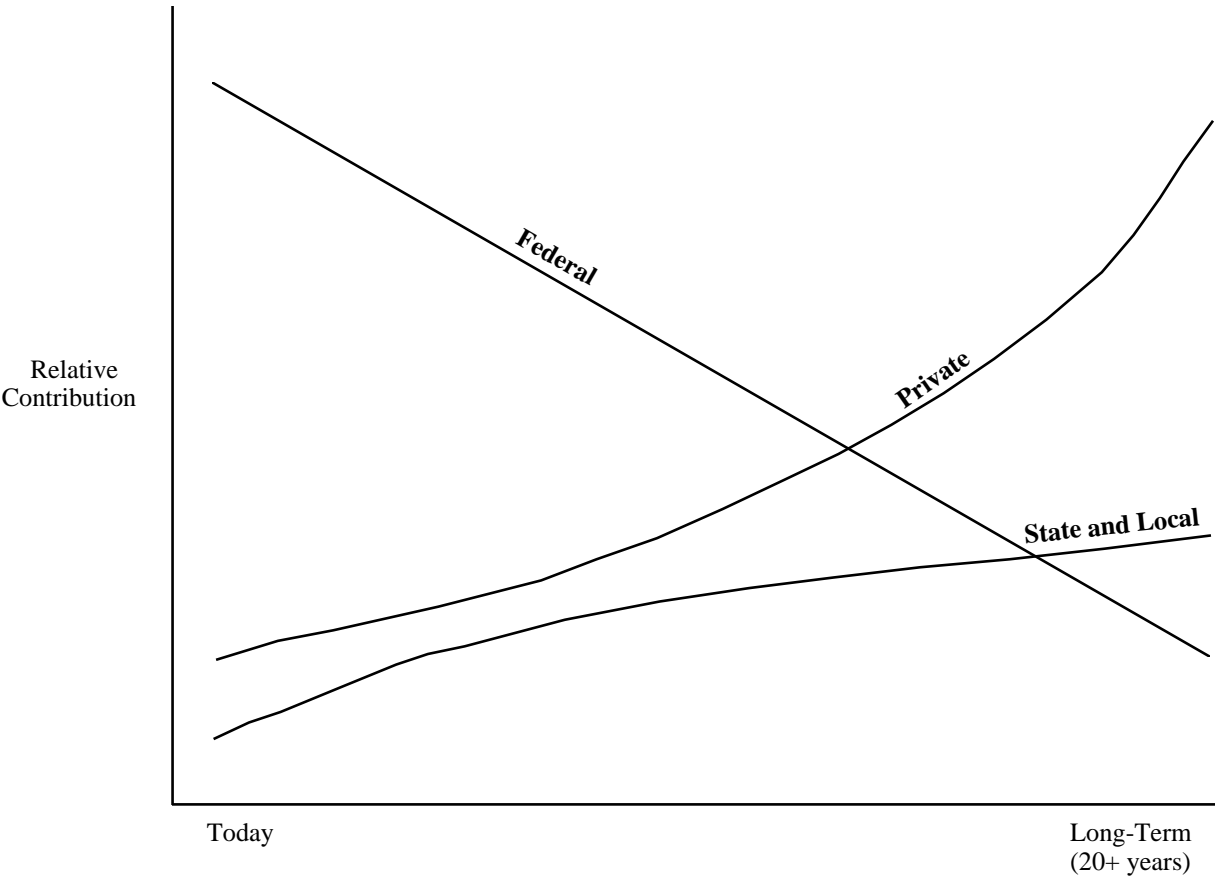
- Expansion of the ITS/CVO program requires the devolution of funding responsibilities from the Federal government to the states, particularly in the areas of operations and maintenance. In many states, the lack of a dedicated funding pipeline for ITS/CVO projects decreases their likelihood for deployment.
- The private sector's role in ITS/CVO deployment is expected to soar. ITS America estimates that over the next 20 years, approximately 80 percent of ITS investment will be provided by private sources,¹ including manufacturers, service providers, other vendors, and end users such as motor carriers. Private sector investment is already substantial in many aspects of the CVO program, including systems for roadside electronic screening, route guidance and information, fleet tracking, obstacle warning, and vehicle safety monitoring. The private sector's role is expected to grow in the future, requiring the development of new models for partnerships between the public and private sectors.

Figure 1.1 characterizes the expected evolution of ITS/CVO funding into the future. As the figure shows, the role of the private sector and state and local governments is expected to grow dramatically. The Federal share of total investment costs is expected to drop off over time. Those charged with the implementation of ITS/CVO projects and programs must anticipate and leverage new funding opportunities to succeed in this emerging funding environment.

This paper provides an overview of potential funding strategies for ITS/CVO projects and programs. It identifies the range of funding sources and strategies available to implementing agencies (Section 2.0), and suggests action steps to aid in state planning and program development activities (Section 3.0).

¹ ITS America and the U.S. Department of Transportation, *ITS National Investment and Market Analysis*, May 1997.

Figure 1.1 Long-Term Funding Responsibilities



2.0 Funding Sources and Strategies

This section describes funding sources for ITS/CVO projects and programs. The funding sources fall into three major categories:

1. Federal;
2. State and local; and
3. Private and public/private partnerships.

Examples of these funding sources in action are included throughout this section.

■ Federal

The Federal government has been the catalyst for ITS/CVO development and deployment to date. It is the primary source of funding for research, development, testing, and capital costs at this time. The Federal funding sources described in this section are:

- FHWA ITS/CVO Program;
- ITS/CVO Deployment Incentive Funding (proposed);
- Motor Carrier Safety Assistance Program (MCSAP);
- Federal-aid highway programs; and
- Innovative financing mechanisms.

Other Federal sources include the National Highway Traffic Safety Administration (NHTSA), which primarily funds vehicle-related safety programs; the Research and Special Projects Administration (RSPA), which funds hazardous materials transportation safety programs; the Federal Railway Administration (FRA), which funds rail-related hazardous materials transportation safety programs; and the U.S. Department of Treasury/Bureau of Customs, which contributes to international border clearance projects. These other Federal sources are not covered in detail in this paper.

Although the ITS budget is a critical source of funding, the ITS/CVO program eventually must become integrated with other Federal funding programs. The need for integration is driven not only by the competition among metropolitan, rural, and CVO ITS market areas for a limited funding pool, but also by the value of exposing a wide range of Federal personnel, offices, and programs to ITS/CVO.

Table 2.1 summarizes potential Federal government funding sources and their applicability to ITS/CVO programs and projects.

Table 2.1 Potential Federal Government Sources for ITS/CVO Projects

	Safety Assurance	Credentials Administration	Electronic Screening	Carrier Operations
FHWA ITS/CVO Program	●	●	●	●
Deployment Incentive Funding (Proposed)	●	●	●	●
Federal-aid Highway Programs				
Surface Transportation Program	●		●	●
National Highway System	●		●	●
Congestion Mitigation and Air Quality Improvement			●	●
Interstate Maintenance				●
State Planning and Research	●	●	●	●
Highway Safety Program (402)	●			
Motor Carrier Safety Assistance Program	●		●	
Innovate Finance Mechanisms			●	●

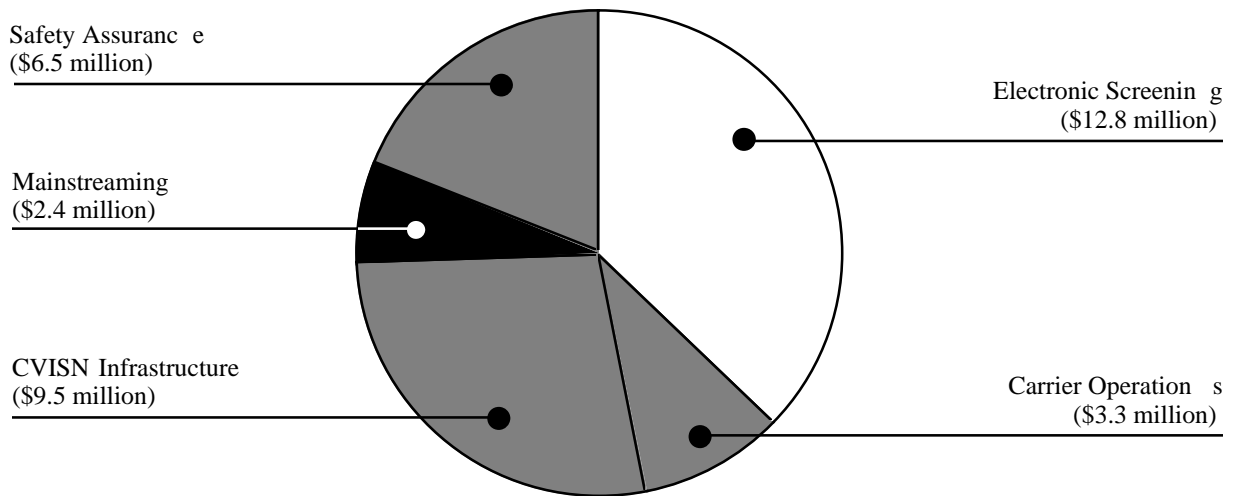
FHWA ITS/CVO Program

FHWA's ITS/CVO program is an element of the national ITS program. Each year, the Federal government spends roughly \$35 million on the ITS/CVO program. From 1992 to 1996, the program was characterized by dramatic increases in Federal support for ITS/CVO research and testing. Federal operational test funding increased from \$1 million in 1992 to an average of \$13 million per year from 1994 to 1996.

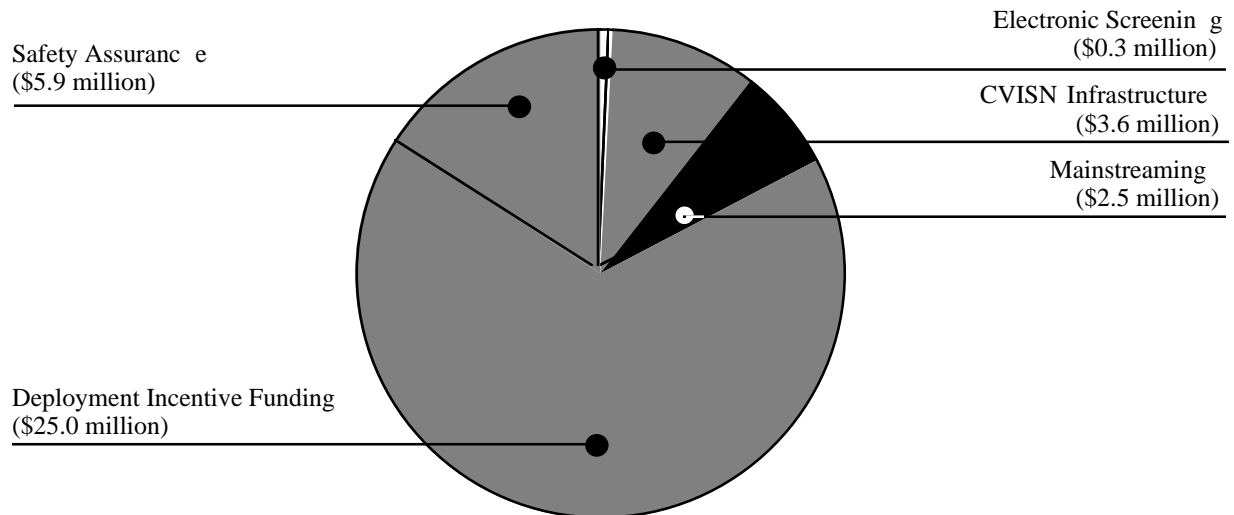
The ITS/CVO program's proposed funding approach for Federal Fiscal Year (FFY) 1998 represents a departure from the research and testing emphasis of the early to mid-1990s. The funding focus would shift to ITS/CVO *deployment*. Of the remaining research resources, *safety assurance* projects and programs would receive the highest priority. This transition is reflected in Figure 2.1, which compares the FFY97 ITS/CVO spending plan to that proposed for FFY98.

Figure 2.1 National ITS/CVO Program Spending Plan

Federal Fiscal Year 1997 (last year under ISTEA authorization)



Proposed Federal Fiscal Year 1998



Deployment Incentive Funding (Proposed)

The Administration's proposal for ISTEA reauthorization includes the establishment of a ITS Deployment Incentive Funding program with anticipated annual authorization of approximately \$100 million. Of this amount, it is assumed that a minimum of 25 percent, or \$25 million, would be allocated for ITS/CVO deployment. This funding would be allocated as follows (see Table 2.2):

- **Model Deployment States** – The first year's increment would go primarily to the CVISN model deployment states (two prototypes and eight pilots) to allow them to complete their deployment efforts in a timely manner.
- **CVISN State Planning and Architecture Workshops** – Over a three-year period, \$100,000 grants would be provided to enable other eligible states to participate in a series of CVISN architecture and design workshops. To be eligible for this grant, a state must complete its State ITS/CVO Business Plan, participate in initial training courses, and contribute to the appropriate Regional Coordination Plan. The workshops are designed to create detailed CVISN Project Plans, which can serve as proposals for CVISN deployment projects.
- **Core Infrastructure Deployment** – An allocation of \$1.5 million per year for two years would be reserved to support deployment of several core infrastructure systems, including the International Registration Plan (IRP) and International Fuel Tax Agreement (IFTA) clearinghouses. This funding would be used to encourage states to connect to clearinghouses and to support uniform safety information exchange and electronic screening processes and systems.
- **Full CVISN Deployment** – The bulk of the funding, \$97 million over the six-year period, would support CVISN deployment projects in up to 32 additional states. These funds would be awarded to states in a competitive bid process, with each state receiving an estimated grant of \$3 to \$4 million. Each state would be required to provide a 50 percent cost share.
- **IBC Deployment** – In addition, \$26 million would support international border clearance deployment projects.

Motor Carrier Safety Assistance Program (MCSAP)

The MCSAP is a key source of funding for the deployment of ITS/CVO safety assurance and electronic screening projects. The MCSAP is a grant program from the Federal government to the states to enforce uniform Federal and state safety and hazardous materials regulations and rules applicable to commercial vehicles and their drivers. To qualify for participation, a state must adopt and enforce the Federal Motor Carrier Safety Regulations (FMCSR) or similar state rules that are compatible with the FMCSRs and the Hazardous Materials Transportation Regulation.

Table 2.2 Proposed ITS/CVO Deployment Incentive Funding (Millions)

	FY98	FY99	FY00	FY01	FY02	FY03
10-State Deployment	\$20.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
CVISN State Planning and Architecture Workshops	\$1.5	\$1.5	\$1.0	\$0.0	\$0.0	\$0.0
Core Infrastructure Deployment	\$1.5	\$1.5	\$0.0	\$0.0	\$0.0	\$0.0
Full Deployment to up to 32 Additional States	\$0.0	\$17.5	\$19.5	\$20.0	\$20.0	\$20.0
International Border Clearance Deployment	\$2.0	\$4.5	\$4.5	\$5.0	\$5.0	\$5.0
TOTAL	\$25.0	\$25.0	\$25.0	\$25.0	\$25.0	\$25.0

MCSAP's objective is to reduce truck and bus involvement in collisions by minimizing the hazards associated with large commercial motor vehicles on the nation's highways. At this time, all 50 states, the District of Columbia, and five U.S. territories participate in the MCSAP.

The FHWA's Office of Motor Carriers administers the MCSAP program, which was funded at \$90 million in Federal fiscal year 1997. Under MCSAP, states prepare a Commercial Vehicle Safety Plan (CVSP), which outlines how they intend to achieve their objectives under the grant. The Governor of each state designates a lead agency to administer the grant program for the state. Basic grant funds reimburse 80 percent of the state's total eligible expenses. Certain other activities, such as research and development, are reimbursed at 100 percent.

MCSAP funding is used to support state roadside inspection activities. State inspectors follow inspection procedures established by the Commercial Vehicle Safety Alliance, thereby ensuring uniformity. In addition to the roadside inspection program, many states are conducting compliance reviews at the motor carriers' place of business.

The ISTEA added programs for which grant monies may be made available to the states. These include traffic enforcement, detection of the unlawful presence of controlled substances in a commercial vehicle or on the person of any occupant of such a vehicle, and certain size and weight enforcement activities.

Within the past several years, MCSAP funds have been used not only for basic commercial vehicle and driver inspection activities, but also for a number of new and innovative programs to improve truck safety. For example, the High Risk Driver Program is studying the field detection and measurement of fatigue in drivers, while ITS research and development efforts promise significant improvements in driver and vehicle monitoring capabilities. Other eligible uses of MCSAP funds include the purchase of pen-

based computers for roadside inspectors, roadside access to safety information systems, and deployment of automated brake testing devices.

MCSAP at Work: State of Connecticut

Supported in part by MCSAP funding, the state of Connecticut has deployed a state-wide commercial vehicle safety program that has served as model for other states. Rhode Island has duplicated the system, and Massachusetts and New Jersey are likely to follow. Connecticut's MCSAP basic grant (approximately \$600,000) was used to cover the salaries of roadside and other inspectors. In addition, Connecticut used a \$41,000 MCSAP research and development grant, along with other state and private resources, to develop projects such as cellular digital packet data applications. The state also used National Governors' Association money, funneled through MCSAP, to develop ITS/CVO safety improvements focused on high-density incident locations.

Federal-Aid Highway Programs

Increasingly, ITS/CVO projects and programs will need to tap Federal-aid highway programs as a source of funding for planning, deployment, and operations. These sources are particularly important for the ITS/CVO services that are focused on roadside operations and traffic management, such as commercial vehicle traveler information systems and hazardous materials incident response services.

Under the ISTEA, the use of Federal-aid funds for ITS/CVO programs was a new activity, and FHWA regional offices tended to vary in their interpretation of the eligibility requirements. The Administration's proposal for ISTEA reauthorization would expand and clarify the eligibility of ITS projects for many of the Federal-aid highway programs. Although the final legislation may restructure some of the basic programs, it appears that the following programs (or their successors) will serve as potential ITS/CVO funding sources:

- The **Surface Transportation Program (STP)**, which can fund a wide range of capital and operational improvements to the Federal-aid highway system. STP funds are allocated largely at the discretion of each state. ITS/CVO activities eligible for STP funding may include highway safety programs, planning activities, and capital and operating costs for traffic management facilities and programs.
- The **National Highway System (NHS)**, which can fund capital, operational, and highway safety improvements on segments of the 161,108-mile NHS network. Operational improvements include traffic surveillance and control equipment, motorist information systems, and incident management programs. Electronic screening systems also may qualify for NHS funding.
- The **Congestion Mitigation and Air Quality Improvement (CMAQ)** program, which can fund transportation activities that are likely to improve air quality. CVO traffic management activities and electronic screening, particularly in urban areas, would qualify for this funding.

- The **Interstate Maintenance (IM)** program, which can fund rehabilitation, restoration, and resurfacing of the Interstate System. Reconstruction also is an eligible activity if it does not add capacity. ITS/CVO projects in Interstate construction zones, such as weigh station upgrades and traffic management systems, may be eligible for IM funding.
- The **State Planning and Research (SPR)** program, which apportions money to the states for activities such as planning, technical studies and assistance, demonstrations, management training, and cooperative research. Technical and organizational ITS/CVO activities may be eligible for this program.
- The **Highway Safety Program (402 Program)**, which is a continuing program jointly administered by the FHWA and the National Highway Traffic Safety Administration (NHTSA). Program 402 funds may be used for non-construction activities that support the selection and implementation of safety construction and traffic operational improvements.

Further details of these programs are provided in Appendix A.

Each ISTEA highway program category has funds which are apportioned to the states, who then select qualifying projects. Federal-aid highway funds generally are administered by state departments of transportation (DOTs) and metropolitan planning organizations (MPOs). However, ITS/CVO projects are being implemented by a range of agencies such as state police, departments of revenue, and departments of motor vehicles, who may not be able to access Federal-aid highway funds unless they form partnership agreements with the state DOTs.

In addition, the state DOTs and MPOs must choose between ITS/CVO and competing demands for the obligation of these funds. Key planning and budget staff in these agencies often have limited familiarity with ITS/CVO. In addition, because the mandate and organization of ITS/CVO programs are still developing in many states, ITS/CVO often takes a back seat to more traditional, big-ticket items such as highway and bridge construction and maintenance. In fiscal 1994, just seven percent of obligated NHS funds and 13 percent of obligated STP funds were earmarked for all traffic and safety projects. ITS/CVO represents just one element of this funding category.

Leveraging Federal-Aid Resources: State of Utah

Utah's roadside ITS/CVO system includes weigh-in-motion devices, automatic vehicle identification (AVI) systems, and in-cab transponders. Although Utah has used state funds (primarily its general fund) almost exclusively to deploy this system, Federal funding has served as a catalyst for key areas of the program.

Utah used Federal funding six years ago to design its AVI technology. In addition, Utah currently is building a new truck enforcement facility on Interstate 80 near the Wyoming border using both state and Federal-aid (NHS) money.

Innovative Finance

Innovative financing is a relatively new initiative within the highway and transit programs. Innovative finance tools seek to complement traditional financing techniques by directing resources to areas of critical importance and responding to the shortfall in conventional public funding sources for transportation. The core approach is to foster public-private partnerships; identify and leverage areas in which the public may be willing to pay direct user charges; leverage new sources of capital; and allow transportation projects to be developed more quickly and at less cost than would be possible under conventional public procurement, funding, and ownership. While it may provide financial flexibility and leverage additional revenue, innovative financing represents a major departure from the traditional grant reimbursement mechanism and exposes the highway and transit programs to a greater level of risk.

A few of the more applicable innovative financing mechanisms are as follows:

- **State Infrastructure Banks (SIB)** – A SIB is a state or multi-state investment fund that provides loans, credit enhancements, and other forms of financial assistance to transportation projects that anticipate generating future revenues. The FHWA has instituted a pilot SIB program, in which 38 states and Puerto Rico are participating. A significant portion of ITS/CVO projects would be eligible and appropriate for SIB support.
- **Federal Credit** – The Transportation Infrastructure Finance and Innovation Act of 1997 (TIFIA) seeks to address the funding shortfall for large transportation investments by providing Federal credit in the form of direct loans, loan guarantees, and standby lines of credit to public and private sponsors. This program focuses on very large (minimum \$30 million for ITS) projects, so very few ITS/CVO projects would be eligible or appropriate for this program. However, if ITS/CVO projects are packaged within a broader set of transportation improvements, it is possible that ITS/CVO could be a beneficiary of this program.
- **GARVEE Bonds** – Grant Anticipation Revenue Vehicle (GARVEE) bonds enable states to assemble up-front capital that is secured, at least in part, by future years' Federal-aid highway apportionments. A state may use future Federal-aid obligations to retire the principal, interest, issuance, insurance, and other costs incidental to the sale of an eligible financing instrument. The state would designate the advance construction amount up front, and would repay the debt service each year using its Federal-aid grant monies. This financing mechanism is particularly effective for non-revenue-generating projects seeking debt financing.
- **Tapering** – Tapering is a grant-management technique that allows the non-Federal matching share on Federal-aid projects to vary over time. Federal reimbursement of state expenditures can be as high as 100 percent in the early phases of a project, provided that by the time the project is complete the overall Federal contribution does not exceed the normal Federal-aid limit. Tapering provides states an opportunity to move forward with projects while the state waits for revenue streams to arrive. A non-ITS/CVO example of the use of tapering is in California on the SR 91 Toll Road project. Since revenues did not begin to flow until very late in the construction cycle, the state was allowed to ramp up its Federal match over time, beginning with very little.

- **Donations as “Soft Match.”** – The value of public and private donations to projects (e.g., preliminary engineering and right-of-way) may be used to satisfy the non-matching requirements for Federal funding. Currently, only private donations are credited toward the non-Federal match under current program rules; however, the Administration’s ISTEA reauthorization bill seeks to expand this provision to include the value of public donations as “soft match” (also known as “flexible match”). Public donations also may be credited if the project is accepted under FHWA’s innovative finance program (note the state of Missouri’s experiences in this area in the sidebar).

Innovative financing techniques provide significant opportunities for ITS/CVO projects. ITS/CVO projects that provide revenue streams once deployed will be well-suited to innovative finance. In addition, some states have found ways to leverage non-transportation projects (e.g., investments in communications infrastructure) to provide both valuable communications tools and funding support. Though these tools offer increased flexibility and leveraging potential to project sponsors, to date they largely have been untapped.

Flexing Its Matches: the State of Missouri

In October 1995, the FHWA approved an innovative financing proposal from the Missouri Department of Transportation (MDOT) for development of a statewide ITS network. Missouri’s proposal centered on a plan to use up to \$30 million worth of private funding for a fiber optic communication system as a credit toward development of the statewide ITS program. Once completed, the entire communications infrastructure will be in place to link Missouri State Highway Patrol’s mainframe computer to fixed weigh stations. The fiber optic network will provide the avenue required to process data transmission at the speeds necessary for electronic screening of commercial vehicles traveling at mainline speeds.

MDOT has released another request for proposals for wireless towers along the highway right-of-way. The state will have access to this infrastructure for wireless CVO operations. The \$30 million credit will serve as a future source of non-Federal matching funds for up to \$150 million worth of related projects across the state. This strategy of substituting private funds for state matching funds is known as flexible match.

The application of the flexible match strategy to the Missouri ITS program is noteworthy because it represents an unusual and creative application of the basic concept of flexible match. For most private match projects, states substitute private funds for state funds in meeting the non-Federal matching share (usually 20 percent) required on a given Federal-aid project. However, in the case of the Missouri ITS program, private contributions to one project are being used not as a direct match for that project, but rather as a credit that can support development of future projects of a related nature. As such, the Missouri ITS program as a whole represents a funding strategy that can broaden the application of the flexible match concept to a new generation of public-private partnerships.

■ State and Local Funding

The successful long-term deployment of the ITS/CVO program depends on the availability of state and local funding. In addition to serving as the primary source of Federal matching dollars, state and local governments will bear the majority of operations and maintenance funding. However, relatively few state governments – and even fewer local governments – have dedicated funding sources for ITS/CVO projects.

In most state governments, the responsibility for the administration and enforcement of CVO activities is fragmented among multiple agencies. Each agency receives the majority of its funding from the state general fund or transportation trust fund. In addition, each agency may have access to its own dedicated stream of CVO-related revenue, as follows:

- **State Department of Transportation** – Oversize/overweight vehicle and other permit fees;
- **Public Utilities Commission** – Operating authority fees;
- **State Police** – Citation fees;
- **Department of Motor Vehicles** – Registration and commercial driver’s license fees; and
- **Department of Revenue** – Motor fuel taxes.

In addition, toll authorities that operate bridges, tunnels, and turnpike authorities can provide funding for the planning and deployment of ITS/CVO programs for their facilities.

The potential for increased state funding for ITS/CVO projects is strong. The states collect the majority of trucking-related revenue. In fiscal year 1993, the states collected nearly \$12 billion in revenue from motor carriers in the form of motor fuel taxes, registration fees, and other levies (excluding tolls). In comparison, the Federal government collected \$8 billion in highway user fees from trucks in 1992. Although trucks represent a relatively small share of total vehicle traffic, they account for a large share of highway revenue. Trucks represent at least 30 percent of highway revenue in 19 states, with Indiana the highest at 45 percent.

Nevertheless, the reliance on state funding for ITS/CVO projects faces the following challenges:

- **Limited familiarity of state budget officers with ITS/CVO** – Many state budget officers and planning staff have limited understanding and awareness of ITS/CVO technologies and their potential benefits, and therefore may be reluctant to commit resources to these programs.
- **Difficulties building public/public partnerships and determining acceptable cost-sharing among public agencies** – The allocation of ITS/CVO program costs among participating agencies can be arduous. If one agency is running the program independently, regular operations and maintenance can be funded out of that agency’s operating budget, but major capital purchases may need to be financed from bond proceeds. If more than one agency is involved, each agency usually finances its own

staff and operations, but allocation of capital costs can be nettlesome. Major multi-agency projects, such as the development of a new information system, usually require cost-sharing among several agencies.

- **Competition with other projects and priorities in agencies** – In each of these agencies, CVO may represent only one portion of their responsibilities. In some cases, spending on CVO systems must compete with upgrades to services and systems geared toward the larger passenger car and driver market.

Strategies that states may consider for funding ITS/CVO projects include the following:

- **Linking agency budgets to revenue collection** – In some states, CVO-related taxes and fees are paid to a general fund and then budgeted among all state agencies; in other states, CVO-specific revenues are collected and used directly by CVO agencies. Where agency budgets are tied to revenue collection, the investment in ITS/CVO systems that increase motor carrier regulatory compliance (and therefore state revenues) may pay for themselves in a short amount of time.
- **Reprogramming operating cost savings** – Similarly, both roadside and deskside applications of ITS/CVO technologies often reduce agency labor and operating costs. Where agencies are allowed to reinvest these cost savings in their operations, initial cost savings can provide resources to support future technological investment.
- **Loans and credit enhancements** – Many ITS/CVO projects can be funded through direct loans that are secured by future Federal-aid grants (as in the case of the GARVEE bonds), or by the expectation of operating costs savings, increased fines and other CVO-related revenues, or user fees such as charges for equipment or transactions.
- **Cash management** – States increasingly are using innovative financing techniques to manage the use of available Federal-aid and state funds. Examples include phased funding for projects, tapering of Federal contributions, and advanced construction of projects.
- **Asset management** – Enhanced management of available staff and facilities may provide a source of funding for ITS/CVO projects. For examples, states often can reduce implementation costs by outsourcing technical activities such as database management, using innovative contracting and procurement techniques, and sharing resources among agencies (or with other states).

A Multi-State Partnership: Advantage CVO

Advantage CVO (formerly Advantage I-75) is a multi-state partnership along the Interstate-75/Highway 401 corridor. Advantage CVO demonstrates the effective transition of a Federally funded program to a system supported by states and carriers.

The partnership was established to design and implement an operational test of the Mainline Automated Clearance System (MACS). The objective of MACS is to allow transponder-equipped and properly documented trucks to travel any segment along the entire length of the corridor at mainline speeds with minimal stopping at enforcement stations.

Once the Federal operational test funding ended in 1997, the participating states voted to continue the program using state contributions. In order to support the new funding environment, the partnership's current efforts are focusing on increasing the involvement of the trucking community, making the system more efficient, and developing strategic markets for products and services. They expect to rely increasingly on state funding sources for operations, maintenance, and expansion of the system. In addition, they will solicit individual carriers' support by requesting a fee for required software.

■ Private Sector Funding

ITS America has estimated that the private sector – including vehicle and equipment manufacturers, service providers, and individual motor carriers – will account for approximately 80 percent of future ITS/CVO investment. This proportion is substantially larger than the 25 percent share provided by the private sector to date. Private sector involvement to date has focused on the adoption of fleet and vehicle management technologies. If this 80 percent estimate proves even close to the mark, the private sector will have a major influence on what ITS/CVO projects do and do not receive financial support in the future.

Table 2.3 shows generically what types of projects suggest involvement by the public and private sectors. ITS/CVO examples are also provided. Of course, private sector interest varies directly with profit potential. Similarly, involvement by the public sector varies directly with public interest. When both are high, either or both (i.e., public-private partnerships) sectors may become involved.

Table 2.3 Private Sector Involvement in ITS/CVO Projects

		Profit Potential	
		High	Low
Public Interest	High	Public or Private <i>Example: Weigh station bypass, credentials administration</i>	Public <i>Example: Automated safety inspections</i>
	Low	Private <i>Examples: In-vehicle driver information systems, fleet management systems</i>	Neither

There are a number of significant (and well-documented) institutional barriers to private sector participation in ITS/CVO projects and programs. Generally, the private sector is reluctant to commit funds to ITS/CVO without guarantees that the public sector will invest in the necessary infrastructure. At the same time, the public sector is hesitant to deploy the infrastructure without assurance of private sector participation. In addition, a long-standing regulatory relationship between public agencies and the motor carriers complicates the development of stable partnerships.

Although these barriers are significant, there exists a wide variety of opportunities for private sector involvement in ITS/CVO projects and programs. Research projects performed by the Urban Institute,² the Volpe National Transportation Systems Center,³ and others have identified as many as 27 potential deployment models for ITS products and services. The major models in place today include:

- User fees, such as charges for the purchase of transponders and other equipment, or transaction fees for electronic screening and other ITS/CVO systems;
- Franchises, in which the state receives a share of the private sector profits;
- Shared resources, particularly with respect to telecommunications right-of-way; and
- Other public-private partnerships, such as private sector contributions to public sector programs.

Two ITS/CVO example models are described below.

Private Contributions: I-95 Corridor Coalition's FleetForward Program

The I-95 Corridor Coalition's FleetForward program includes an operational test of an advanced traveler information system (ATIS) for commercial carriers. The program is establishing a public/private organization administered by the American Trucking Associations (ATA) Foundation.

The program draws on two sources of funding. The first is a \$750,000 Federal grant provided to the I-95 Corridor Coalition and funneled through the New Jersey Department of Transportation. The second is a minimum of \$250,000 provided by non-public partners, including SmartRoute Systems, IBM, Qualcomm, and the ATA.

² The Urban Institute. *Overcoming Barriers to ITS – Lessons from other Technologies*, December 1995.

³ Volpe National Transportation Systems Center. *Innovative Contracting Practices for Intelligent Transportation Systems*, 1996.

A Public-Private Franchise Model: HELP, Inc.

In the early 1990s, states such as Arizona, California, and Oregon took early leadership in the development of ITS/CVO roadside electronic screening systems. A group of states established a consortium known as Heavy-Vehicle Electronic License Plate (HELP), and received Federal funding to conduct an operational test known as the Crescent demonstration.

At the conclusion of the operational test, Lockheed Martin IMS was selected to serve as the system manager of HELP. Today, HELP, Inc., is a non-profit organization headed by a board of directors represented equally by trucking and state transportation officials. The technologies demonstrated in the Crescent program have evolved into a public-private partnership. Development of HELP was financed in part by a venture capital fund operated by Lockheed Martin IMS. At this time, HELP covers costs of operations by charging transaction fees to users.

HELP, Inc.'s PrePass service allows trucks to be weighed electronically at highway speeds and checked for compliance of state-required credentials and safety rating as they approach inspection facilities and ports of entry. PrePass has been deployed in eight states, with three more expected to offer service soon. Trucks from 42 states and three Canadian provinces are enrolled in PrePass.

3.0 Suggested Action Steps

This section describes suggested action steps for ITS/CVO project managers who seek funding for their projects and programs. It is divided into two sections. The first, “Where to Start,” describes the most timely critical activities, while the second, “What to Do Next,” highlights follow-on actions that will increase the likelihood of funding success.

■ Where to Start

1. **Plan first.** Effective planning should be the first step in any project development. The Federal ITS/CVO Deployment Incentive Funding process requires states to develop strategic business plans, then detailed project plans, before they are eligible for deployment grants. This model is applicable to most other funding sources as well. States with well-conceived ITS/CVO programs and well-defined deployment projects will be the most likely to obtain sufficient funding, whether it be from internal or external (Federal or private sector) sources.
2. **Document the benefits of ITS/CVO projects.** ITS/CVO staff acknowledge that the lack of a natural constituency for ITS/CVO projects makes soliciting funds difficult. Project managers should stress safety and productivity benefits of ITS/CVO, and should include a quantitative analysis of benefits and costs to build support. External partners may also contribute to this process. The results of research studies performed by the ATA Foundation and the NGA, as well as the evaluation of the CVISN model deployment and other operational tests, can provide additional information.
3. **Develop a broad-based funding plan that matches funding sources to project types.** State project managers should develop a broad and deep understanding of Federal, state, and private funding opportunities, and pursue them actively. The funding strategy should be tailored to that state’s particular political and organizational environment. Given limited amounts of time and other resources, it makes sense to first pick off the “low-hanging fruit.” Pursuing these relatively logical sources will provide some momentum for more difficult funding challenges:
 - For *safety assurance* projects, seek MCSAP funding;
 - For *credentials administration*, explore state department of motor vehicles operating budgets;
 - For *electronic screening*, investigate public-private partnerships, Federal-aid highway programs, or innovative financing; and
 - Finally, for *carrier operations* projects, such as traffic management projects that require public sector involvement, seek public-private partnerships and/or Federal-aid highway programs.

■ What to Do Next

1. **Develop and nurture partnerships.** Securing funding for ITS/CVO projects and programs will be difficult, and “going it alone” will simply not be an option. Those states who best leverage their partnerships will find themselves more successful. In general the most important partners are the FHWA, representatives from other ITS/CVO-related agencies within each state, other states, the trucking industry, and technology vendors:
 - *With FHWA* – Understanding FHWA activities and plans is one of the keys to maximizing funding opportunities. The FHWA holds regular meetings and seminars for the purposes of disseminating information and coordinating activities. In addition, states should work closely with their OMC State Director and FHWA Division Administrator to continually appraise funding opportunities.
 - *Within your own state* – A number of state representatives noted that an understanding of state funding sources and processes was one of the key elements of their success. ITS/CVO staff from the state of Colorado, for instance, regularly attend State Transportation Commission meetings in order to monitor funding discussions and to advance the cause of ITS/CVO projects.
 - *With other states* – The Advantage CVO and HELP programs are just two of the many successful multi-state partnerships. State partnerships provide economies of scale for infrastructure and opportunities for technical information sharing.
 - *With the trucking industry* – States should open and maintain a regular dialogue with the trucking industry. This communication helps states determine what their customers need, while gathering invaluable information that is unique to the industry. Improved communication may lead to opportunities for private sector contributions to public sector ITS/CVO projects. Without significant support from the trucking industry, ITS/CVO projects will fail.
 - *With technology vendors* – The most obvious benefit of partnerships with private companies is that they often bring much-needed cash to ITS/CVO projects. But private partners can also provide technical expertise, assistance with the lobbying for ITS/CVO projects, and marketing support. Private sector leadership is particularly appropriate in areas where most of the benefit accrues to private businesses, as well as in areas where the risk is high.
2. **Seek alternative ways to package projects.** The “piggyback” approach is an example of how some states have integrated ITS/CVO projects with traditional transportation projects. Using this approach, ITS/CVO staff determine when capital projects are planned and work with regional engineers to design ITS/CVO projects into them. Separating individual project elements or combining them with metropolitan or rural ITS projects for funding purposes may prove beneficial.

Appendix A. Federal-Aid Highway Programs

This appendix provides an overview of the major Federal-aid highway programs that are potential funding sources for Intelligent Transportation Systems (ITS)/Commercial Vehicle Operations (CVO) projects. The information provided in this appendix pertains to the current structure of each program under the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, and may change as part of the ISTEA reauthorization in 1998.

Federal-aid highway programs are a potential source of funding for many aspects of ITS/CVO. Most Federal-aid highway programs are financed by revenues from the Highway Trust Fund and are administered by the Federal Highway Administration (FHWA). In most cases, multiyear authorization limits have been specified in the ISTEA. Actual spending levels are established in annual appropriations bills. The appropriated funds are apportioned among states and local governments by predetermined formulas. The individual state, local government, or metropolitan planning organization (MPO) has the responsibility to establish priorities and select projects.

This appendix presents information about six Federal-aid highway programs that may be used for ITS/CVO projects. These programs are:

1. National Highway System (NHS);
2. Interstate Maintenance (IM) program;
3. Surface Transportation Program (STP);
4. Congestion Mitigation and Air Quality Improvement Program (CMAQ);
5. State Planning and Research (SPR) program; and
6. FHWA Highway Safety Program.

For each of these programs or mechanisms, the following information is provided:

- Description of program;
- Authorized funding levels;
- Eligible activities; and
- ITS/CVO project eligibility.

■ National Highway System (NHS)

The National Highway System (NHS) was authorized by the ISTEA to replace the former Interstate 4R and primary programs. The NHS, which was designated in November 1995, comprises the Interstate Highway System and other highways of national significance.

The NHS comprises 161,068 miles of highways as of February 1998. The NHS focuses resources on these high-order roads that are important to interstate and international commerce, national defense, and intermodal connections. The NHS represents only four percent of the nation's total mileage but carries 42 percent of all travel and approximately 70 percent of travel by commercial vehicles. Approximately 75 percent of the NHS mileage is in rural areas and 25 percent in urban areas. Sixty percent of the travel on the NHS occurs in urban areas.

Funding

Funding for the NHS totaled \$20.5 billion for the Federal fiscal years 1991 to 1997. In addition, \$17 billion of the Interstate Maintenance funds are available for the Interstate portion of the NHS. NHS funds are distributed based on each state's historic share (1987-1991) of Federal-aid highway funds. The Federal share of project costs using NHS funds is 80 percent, but the Federal share may be increased to 90 percent for resurfacing, restoration, and rehabilitation work and certain reconstruction activities on the Interstate system. Certain safety and traffic operation activities are eligible for 100 percent Federal share.

Eligible Activities

NHS funds may be used for a variety of projects along these roadways, including the following:

- Construction, reconstruction, resurfacing, restoration, and rehabilitation of segments of the NHS;
- Operational improvements of segments of the NHS (defined as capital costs for the installation of traffic surveillance and control equipment, computerized signal equipment, motorist information systems, integrated traffic control systems, incident management programs, transportation demand management facilities and programs, and other capital improvements approved by the U.S. DOT);
- Construction of, and operational improvements for, a Federal-aid highway not on the NHS if the highway is in the same corridor as, or in proximity to, a fully access controlled NHS highway and the project will improve the level of service on the NHS highway and be more cost-effective than work on the NHS highway;
- Capital and operating costs for traffic monitoring, management, and control activities on an NHS segment; and
- Transportation planning, highway-related technology transfer activities, and research and development activities.

NHS projects are selected from an approved Transportation Improvement Plan (TIP) developed by the state in cooperation with a Metropolitan Planning Organization (MPO) in urbanized areas over 50,000 population and in consultation with affected local officials in all other areas.

Toll roads, bridges, and tunnels are eligible for Federal funds on the same basis as non-tolled facilities, except that funds can not be used to construct new toll Interstate highways or to convert a free Interstate highway into a toll facility.

ITS/CVO Project Eligibility

ITS/CVO represent just one of many potential uses of NHS funds. ITS/CVO operational improvements eligible for NHS funding include traffic surveillance and control equipment, motorist information systems, and incident management programs. Electronic screening systems also may qualify for NHS funding.

■ Interstate Maintenance (IM) Program⁴

The Interstate System consists of approximately 45,012 miles of fully controlled access, arterial highways. The system accounts for only 1.2 percent of the nation's total highway mileage, yet 23 percent of total travel occurs here. Although part of the National Highway System (NHS), the Interstate System retains a separate identity and receives separate funding.

Funding

The Interstate Maintenance (IM) program was authorized for six years at a total of \$16.5 billion. The 1997 funding level authorized in ISTEA is \$2.9 billion.

Funds are apportioned to the states and are available for four-year periods. The normal Federal share is 90 percent. IM funds are apportioned based on Interstate lane-miles (55 percent) and Interstate vehicle-miles of travel (45 percent). Each state is guaranteed a minimum annual apportionment of no less than 0.5 percent of the total IM funds.

Eligible Activities

The IM program finances rehabilitation, restoration, and resurfacing of the Interstate System. Reconstruction also is an eligible activity if it does not add capacity, except in the case of high-occupancy vehicle (HOV) lanes. Reconstruction of bridges, interchanges, and over-crossings along existing Interstate routes, including the acquisition of right-of-way, also may be funded.

⁴ Hearing on Maintaining Adequate Infrastructure: The Interstate Maintenance, National Highway System, Bridge and Reimbursement Programs, Wednesday, June 5, 1996 – 9:30 a.m., 2167 Rayburn House Office Building.

ITS/CVO Project Eligibility

ITS/CVO projects in Interstate construction zones, such as traffic management systems or reconstruction of existing weigh stations, may be eligible for IM funding.

■ Surface Transportation Program (STP)

The Surface Transportation Program (STP), created in the ISTEA, replaced programs used to fund primary-system highways in urban areas, urban system highways, and all secondary system highways.

Funding

Authorized STP funding totals \$23.9 billion over six years (FFY 1991-1997). The formula for distribution of STP funds is based on each state's historic share (FFY 1987-1991) of total Federal-aid highway funding. The Federal share of STP projects is 80 percent and can be 90 percent for certain projects on the Interstate system. Certain safety and traffic operations may have a 100 percent Federal share.

Eligible Activities

STP funds may be used by states and localities for many activities, including projects on any roads that are not classified as local or rural minor collectors. The states also may use STP funds for the capital costs of transit projects. Prior to general use of STP funds, states are required to follow statutory set-asides of STP funds for safety construction and transportation enhancements. As with the NHS, STP projects are selected from an approved TIP. Eligible STP activities include:

- Construction, reconstruction, resurfacing, restoration, rehabilitation, and operational improvements for highways (including Interstate highways and bridges);
- Capital costs for transit projects and publicly owned intracity or intercity bus terminals and facilities;
- Highway and transit safety improvements and programs, hazard eliminations, projects to mitigate hazards caused by wildlife, and railway-highway grade crossings;
- Surface transportation planning, highway and transit technology transfer activities, and research and development;
- Capital and operating costs for traffic monitoring, management, and control facilities and programs;
- Most transportation control measures in the Clean Air Act Amendments of 1990 (CAAA); and
- Development of management systems and transportation plans.

ITS/CVO Project Eligibility

The broad uses available for STP funds suggest that many ITS/CVO roadside activities, particularly those related to safety and traffic management, could be funded through this program. ITS/CVO activities eligible for STP funding may include highway safety programs, planning activities, and capital and operating costs for traffic management facilities and programs.

■ Congestion Mitigation and Air Quality Improvement Program (CMAQ)

The original purpose of the CMAQ program, as described in ISTEA, was to fund transportation projects or programs that will contribute to attainment of a national ambient air quality standard (NAAQS), primarily for ozone and carbon monoxide (CO). The 1995 NHS legislation expanded the program's eligibility to "maintenance areas," which are urbanized areas that were designated as non-attainment under the CAAA of 1990 but were since redesignated to attainment status by the U.S. Environmental Protection Agency (EPA).

Funding

The ISTEA authorized \$6 billion under the CMAQ program. Total apportionments totaling \$1 billion were made each year to the states between 1992 and 1997. The first CMAQ apportionment was made in December 1991, and the last will not lapse until the end of fiscal year 2000.

The Federal share for most eligible activities and projects is 80 percent, rising to 90 percent if used on certain activities on the Interstate system. Activities including traffic control, signalization, and commuter carpooling and vanpooling, may be funded at 100 percent Federal share if they meet certain conditions.

Funds are distributed based on each state's share of population in air quality non-attainment areas, and the severity of the non-attainment levels in each state. However, each state is guaranteed at least 0.5 percent of CMAQ funds.

Eligible Activities

In general, all projects and programs eligible for CMAQ funds must come from a conforming transportation plan and transportation improvement program (TIP), and be consistent with the conformity provisions contained in Section 176(c) of the Clean Air Act. These projects fall into the following categories:

- **Traffic flow improvements** – traffic management and control services, signalization projects, intersection improvements, and construction or dedication of HOV lanes, etc.
- Experimental pilot projects.

- **Transit projects** – facilities, vehicles and equipment, operating assistance for new transit service, etc.
- **Shared-ride** – vanpool and carpool programs, and parking for shared-ride services, etc.
- **Demand management** – trip reduction programs, transportation management plans, flexible work schedule programs, vehicle restriction programs, etc.
- **Pedestrian/bicycle** – bikeways, storage facilities, promotional activities, etc.
- Incident management and other traffic control measures not covered by the above categories.

ITS/CVO Project Eligibility

CVO traffic management activities and electronic screening, particularly in urban areas, would qualify for this funding.

■ **State Planning and Research (SPR)**

Since the 1930s, Federal legislation has allocated a portion of Federal-aid highway funding to cover surveys, planning, engineering investigations, and other research activities in support of future highway improvements. The ISTEA continued this activity through the State Planning and Research (SPR) program.

Funding

Two percent of the funds apportioned to the states for the NHS, IM, STP, CMAQ, Interstate Construction, and bridge programs are set aside for the SPR program. The fiscal year 1997 apportionments for the SPR program totaled \$8.3 million. The states may supplement this amount with additional NHS or STP funds. The normal Federal share of SPR activities is 80 percent.

Eligible Activities

Eligible activities include:

- Engineering and economic surveys;
- Planning of future highway programs and transportation systems;
- Development of management systems;

- Studies of the economy, safety, and regulation of highway usage; and
- Research, development, and technology transfer activities necessary in connection with the planning, design, and maintenance of highway and transit systems.

At least 25 percent of each state's SPR funding must be used for this final R&D category.

ITS/CVO Project Eligibility

Technical and organizational ITS/CVO activities may be eligible for this program. SPR funds could be used to support the development and update of ITS/CVO business and project plans, benefit/cost analyses, market research and feasibility studies, and regulatory reengineering studies. In addition, SPR funds could be used to design weigh stations and other roadside facilities.

■ **FHWA Highway Safety Program (402 Program)**

The 402 Program is a continuing program jointly administered by the FHWA and the National Highway Traffic Safety Administration (NHTSA). The 402 program was created in 1966. The FHWA is responsible for programs relating to highway (including identification and surveillance of accident locations; highway design, construction, and maintenance; traffic engineering services; and pedestrian safety). The NHTSA is responsible for programs relating to the vehicle and the driver.

Funding

Total authorized funding is \$117 million over fiscal years 1992 to 1997. The normal Federal share is 80 percent, but may rise to 95 percent in states with large areas of public lands. The program generally is administered through grant applications for specific projects by the governor's safety representative in each state.

Eligible Activities

Program 402 funds may be used for non-construction activities that support the selection and implementation of safety construction and traffic operational improvements. These activities include:

- Data collection;
- Engineering studies;
- Developing technical guides and materials;
- Purchasing equipment for inventorying, monitoring, and testing;
- Providing technical highway safety training; and
- Developing highway safety construction programs.

ITS/CVO Project Eligibility

Program 402 funds may be used for non-construction ITS/CVO activities that support the selection and implementation of safety construction and traffic operational improvements.